

# Knowledge, Attitude and Practice toward Cervical Cancer and Cervical Cancer Screening and Its Associated Factors among Women in the City of Bamenda, Cameroon

Fongang Che Landis<sup>1,2</sup>, Enow-Orock George<sup>1,3</sup>, Njajou Omer<sup>1,4</sup>, Ngowe Ngowe Marcelin<sup>1,5</sup>

<sup>1</sup>Faculty of Health Sciences, University of Buea, Cameroon

<sup>2</sup>Faculty of Health Sciences, University of Bamenda, Cameroon

<sup>3</sup>Regional Hospital, Bafoussam, Cameroon

<sup>4</sup>School of Public Health, University of Minnesota, USA

<sup>5</sup>Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Cameroon

## ABSTRACT

**BACKGROUND:** Invasive Cervical Cancer (ICC) has been identified as the second most common cause of morbidity and mortality compared to other cancers among women in Cameroon. Cervical cancer can be treated effectively if diagnosed early. Effective methods for early detection of precancerous lesions using cytology, histopathology, VIA and VILI exist and have shown to be successful in high income countries. However, competing health care priorities, lack of information have made high coverage on cervical cancer screening in most low- and middle-income countries such as Cameroon difficult to achieve.

**AIM:** The aim of this study was to evaluate the knowledge, attitude and practice towards cervical cancer and cervical cancer screening as well as its associated factors among women in Hospitals based in the City of Bamenda

**MATERIALS AND METHODS:** A hospital based cross-sectional study design was used and participants were selected using Random clustered sampling technique whereby each hospital was considered as a cluster. Sample size was calculated using Cochran formula of 1963. A Self-administered questionnaire was used to assess knowledge, attitude and practice on cervical cancer and cervical cancer screening. Data collection took place for a period of 2 months from January, 2020 to February, 2020.

**RESULTS:** Four hospitals were randomly chosen by ballot out of seven hospitals currently carrying out cervical cancer screening in the North West region. A total of 370 participants were recruited. The mean age of the respondents was 41 years (SD=13.9). About half 186(50.3%) of the respondents were experiencing ceased menstruation, the mean age for first sexual intercourse was 19.04 ( $\pm$  SD 3.19) years. A total of 162 (43.8%) of the women had adequate knowledge on cervical cancer. 197 (53.2%) of the sampled women in Bamenda reported with positive attitudes towards cervical cancer. Only, 178 (45.4 %) of the women in the city of Bamenda presented with a good practice about cervical cancer. Women aged 41-50 (AOR=4.96; 95% CI: 2.22-11.07; p=0.000), 51-60 (AOR=3.71; 95% CI: 1.50-9.19; p=0.005), and above 60 years (AOR=4.25; 95% CI: 1.54-11.76; p=0.005) were 4 times more likely to report with adequate knowledge on cervical cancer. Women working in the health sector (AOR=7.52; 95% CI: 2.85-19.85; p=0.000) and students (AOR=7.61; 95% CI: 3.19-18.14; p=0.000) were about 7 times more likely to report with adequate knowledge compared to their counterparts who were in the business sector (AOR=3.62; 95% CI: 1.53-8.56; p=0.003). The women who had ceased from having regular menses were about 2 times more likely to report with positive attitudes towards cervical cancer. Women who did not know if they had a family history of cervical cancer (AOR=0.52; 95% CI: 0.27-0.99; p=0.047) were 5 times more likely to report a positive attitude towards cervical cancer. The women who were more than 60 years old (AOR=20.89; 95% CI: 3.89-105.1; p=0.000) were 20 times more likely to report with good practice. Followed to that were women who were 51 to 60 years (AOR=6.09; 95% CI: 1.74-23.43; p=0.005) who were 6 times more likely to report with good practice than their counterpart who were 21 to 30 years old.

**CONCLUSION:** This study showed that less than half of the population were knowledgeable about cervical cancer, about half of the population had a positive attitude towards cervical cancer, Less than half the number of participants presented with good practice. The correlation between participants' knowledge, attitude and practice showed that there was a significant association which therefore provides sufficient evidence to reject the null hypothesis. The result obtained in this study indicates how useful it will be to establish health education programs to increase women's awareness and knowledge about cervical cancer.

**KEYWORDS:** Knowledge, Attitude, Practice, Associated factors

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## INTRODUCTION

Cancer is a disease in which cells in the body grow out of control [1]. Cancer is always named for the part of the body where it starts, even if it spreads to other body parts later. When cancer begins in the cervix, it is referred to as cervical cancer. Every woman is at risk of developing cervical cancer if appropriate measures are not introduced early enough [1]. It mostly occurs in women over the age of 30 years. It is estimated that every year, more than 270 000 women die of cervical cancer around the world, with approximately 85 % of these deaths coming from middle and low income countries like Cameroon [1]. The major cause of cervical cancer is Human papillomavirus (HPV) [1]. There are more than 100 types of HPV, of which at least 13 are cancer-causing (also known as high risk type). Studies show that two HPV types (16 and 18) cause 70% of cervical cancers and precancerous cervical lesions [1].

According to International Agency for Research on Cancer [IARC] [2], Invasive Cervical Cancer (ICC) has been identified as the second most common cause of morbidity and mortality among women in Cameroon [2]. They estimated an approximately 17.5 deaths per 100,000 per year and 30.0 cases per 100,000 per year versus 17.6 deaths per 100,000 and 35.3 cases per 100,000 for breast cancer [3], but this could be an underestimation due to the lack of specific country-level data on cervical cancer screening and the absence of a national cancer registry [4,5]. Though there is no reliable data on its incidence and pattern, with an estimated 15,000 new cases diagnosed annually and a prevalence of about 25,000 cases throughout the country, cancer is being increasingly recognized as a public health problem in Cameroon [6].

A report by Enow-Orock *et al* [6] on new cancer cases within the periods of 2004–2006/2010–2011 in the Yaounde population in Cameroon where data from the Yaounde Cancer Registry (YCR) were reviewed showed a total of 4,689 new malignant cases were recorded in the Yaounde population during the 5 years period (2004–2006/2010–2011). This gave an annual average of 938. 1,788 (32%) were males and 2,852 (68%) were females. the commonest cancers found in this population were: breast (18.5%), cervix (13.8%), Non-Hodgkin lymphoma (11.9%), prostate (7.3%), Kaposi sarcoma (6.9%), liver (2.9%), colorectal (2.9%), soft tissue (2.8%), ovary (2.4%) and skin (2.3%). Breast cancer was the most frequent cancer during this period followed by cancer of the cervix among females. Cancer of the cervix uteri was the second most common cancer among females as well as when cancers in both sexes were combined [6].

Studies carried out by WHO [7] showed that the pathophysiology of cervical cancer begins when the HPV virus enters through small breaks in the cervical epithelium near the squamocolumnar junction and infects cells of the basal layer of the squamous epithelium [7]. The virus divides within the nuclei of cells and the viral division is synchronized with epithelial cell division. As the epithelial cells divide, mature and move towards the surface, the replicating viruses also move with them and finally come out of the epithelium [7]. Since most women can clear the viral infection due to natural immunity, they do not develop cervical neoplasia. The malignant process starts if the infection is persistent and the viral DNA gets integrated into the host DNA. Such integration leads to the production of harmful onco-proteins (proteins causing cancer) in the

cervical epithelial cells. These onco-proteins disrupt the normal regulatory mechanisms of cell division and this initiates the process of carcinogenesis [7].

Many countries in Africa such as Ethiopia have put in place a strategic goal to reduce cancer incidence and mortality this is because of the high mortality associated with cancer and cervical cancer is increasingly considered a priority cancer. Methods that have been identified to be efficient in reducing the prevalence are centered around awareness on preventive measures, signs and symptoms and early diagnosis and treatment of positive cases [8].

Cervical cancer can be treated effectively if diagnosed early. Precancerous cells usually can be removed without harming healthy cells. If the abnormal cells have become cancerous, the most common treatments are surgery, radiation and chemotherapy [2]. Despite all the measures being put in place to control cervical cancer in most developing countries, lack of adequate communication measures on cervical cancer, lack of adequate knowledge on risk factors and the practice of preventive measures such as screening and early treatment, lack of Information Education and Communication /Behaviour Change Communication (IEC/BCC) and lack of knowledge and practice of immunization against HPV are some of the challenges faced [8].

According to Manga *et al* [9], there is profound difficulty faced by patients in getting treatment such as radiation in Low and Middle-Income Countries (LMIC) like Cameroon [9]. He also supports the view that cervical cancer prevention via vaccination with routine screening is crucial in addressing the growing burden of cervical cancer in low and middle income countries. For this to be feasible, Knowledge, attitude and practice level of the community is very essential about the signs and symptoms of cervical cancer, risk factors, benefits of early diagnosis and treatment, availability of health services and prevention methods (HPV vaccination) [10].

Effective methods for early detection of precancerous lesions using cytology (Pap smear), Visual Inspection with Acetic acid (VIA) exist and have shown to be successful in high income countries. However, competing health care priorities, insufficient financial resources, weak health systems, and limited numbers of trained reproductive health providers have, lack of information on cervical cancer and cervical cancer screening have made high coverage for cervical cancer screening in most low- and middle-income countries such as Cameroon difficult to achieve [11]. Considering the relative high population and susceptibility levels of women as well as the relatively low socioeconomic status of women in the city of Bamenda we wonder if these women have adequate knowledge, positive attitude towards cervical cancer and if these has an impact on the practice of cervical cancer screening.

The aim of this study was to evaluate the knowledge, attitude and practice towards cervical cancer and cervical cancer screening as well as its associated factors among women in the City of Bamenda. Specifically, the objectives of this study were:

1. To assess the knowledge towards cervical cancer and cervical cancer screening as well as its associated factors among women in the City of Bamenda

2. To determine the attitude towards cervical cancer and cervical cancer screening as well as its associated factors among women in the City of Bamenda
3. To determine the practice towards cervical cancer and cervical cancer screening as well as its associated factors among women in the City of Bamenda

We therefore hypothesized that there is no impact of knowledge and attitude on practice of cervical cancer.

## MATERIALS AND METHODS

A hospital based cross-sectional study design was used in this study and participants were selected using Random clustered sampling technique whereby each hospital was considered as a cluster. Four hospitals were randomly chosen by ballot out of seven hospitals currently carrying out cervical cancer screening in the North West region namely: The Regional Hospital, Bamenda, Medicalized Health Centre, Nkwen, St Patrick Hospital, Bamenda, Mulang Health Centre, Bamenda. All the women seeking health care in these hospitals who gave their consent and who were 21 years and above, who were present during the data collection phase in these selected Health facilities were recruited to participate in the study. A Self-administered questionnaire was used to assess knowledge, attitude and practice on cervical cancer and cervical cancer screening. This questionnaire was pretested for validation among 20 women seeking health care in Presbyterian Hospital, Douala and corrections were effected before administration on the study population. This women in Douala were not included in the study. Each woman had 30minutes to fill and submit their questionnaires to data collectors.

**Knowledge on cervical cancer:** 10 questions were asked based on general knowledge, risk factors, manifestations, and prevention of cervical cancer. Correct answers had 1 point and wrong answers had zero. The total knowledge score ranged from 1 to 10. Respondents who had a score below the mean knowledge score of  $4.85(\pm 2.50)$  were classified as having inadequate knowledge while those with mean score and above were considered as presenting with adequate knowledge on cervical cancer. **Attitude towards cervical cancer:** 5 questions were asked based on perceived susceptibility, Perceived severity, perceived effectiveness of treatment, perceived benefit, and cue to action. Correct answers had 1 point and wrongly answers had zero. Respondents who had scores below the mean attitude score of  $3.51(\pm 1.03)$  were classified as having negative attitudes while those with mean score and above were considered as presenting with positive attitudes towards cervical cancer. **Practice about cervical cancer:** 5 questions were asked, with a similar scoring system as previous (correct = 1, wrong = 0). This was based on whether participants have been screened before, the method used, Vaccination against HPV and type of vaccine used. Respondents who had scores below the mean practice of  $0.81(\pm 0.98)$  were classified as having poor practices while those with mean score and above were considered as presenting with good practices towards cervical cancer.

Data were later keyed into the computer using the Epi Info 7.2 software. After cleaning and coding, data was exported and analyzed with Statistical Package for Social Sciences (SPSS) version 25.0. Data were presented as mean  $\pm$  standard deviation (SD) for continuous variables or a percentage (%) for categorical variables. Associations between the knowledge, attitude, practice and independent

variables were assessed using logistic regression. Variables with a p-value of less than 0.05 were fitted into the multivariate logistic regression models to determine predictors of women's knowledge, attitude and practice of cervical cancer. Statistical significance was obtained through adjusted odds ratio with its 95% confidence interval ( $p < 0.05$ ). Correlation between knowledge and attitude, Knowledge and Practice, Attitude and practice was established using logical regression and the composite score of each of these variables were used.

Sample size was calculated using Lorenz formula Cochran formula [12]  $n_0 = z^2 pq / e^2$

$n_0$  = minimum sample size required for infinite population

p = pre-study estimate of the proportion of women who are within the age of 21 and above in the North West Region of Cameroon. A value of 19.1% or 0.191 was used based on a Cameroon Human Papillomavirus and Related Cancers, Fact Sheet 2018 (WHO, 2018).

q = 1-p

e = the degree of precision or the accuracy (=5% or 0.05)

z = standard normal variant at confidence level of 95% (normal value is 1.96)

Hence,

Sample size ( $n_0$ ) =  $(1.96)^2(0.191)(0.809) / (0.05)^2$

= 0.5936/0.0025

= 238 persons

Principal investigator obtained ethical clearance from IRB-FHS (1003-07) at the University of Buea, IRB-CBC (IRB2019-31), IRB of the North West Regional Hospital (N088/APP/RDPH/RHB/IRB). When this was done, administrative approval was obtained from the Regional delegate of Public Health at the North West Regional Delegation, Director of the Regional Hospital, Medicalized Health Centre, Nkwen; St Patrick Hospital, Bamenda; Chief of Centre of the Mulang Health Centre and Heads of the different Health Units. A written informed consent was obtained from each respondent before participation. Codes were used in place of participant's names and data collected were stored safely in a secret file where only the principal investigator had access in order to enhance confidentiality.

## RESULTS

### Socio-demographic characteristics of study participants

A total of 370 participants were recruited into the study. The mean age of the respondents was 41 years (SD=13.9), ranging from 21 to 65 years. Women aged between 21 and 30 years constituted a larger portion [116 (31.45)] of the study participant. About half, 164(44.3%) of the women were from the Catholic religious group. A higher proportion (34.1%) of the participants were having a tertiary level of education. Most, 216(58.4%) of women were married and majority [183 (84.7%)] were into monogamous marriages. A higher proportion (22.7%) of the women were engaged into business activities as their main source of income. The socio-demographic characteristics of study participants are presented in Table 1.

### Reproductive characteristics of study participants

Table 2 shows the reproductive characteristics of women receiving health care in Hospitals based in the city of Bamenda. About half, 186(50.3%) of the respondents were



experiencing ceased menstruation with 103(55.4%) of them being into the menopausal phase. Only, 41(11.1%) of the women had never been pregnant in their lifetime whereas most, 218(58.9%) of those who had been pregnant having a parity between one and four. A handful, 32(8.6%) of the women had committed more than two abortions. Majority, 230(62.2%) of the respondents were having between one and four living children.

### **Sexual and family planning characteristics of study participants**

Table 3 showed that half of the respondents (193; 52.2%) had their first sexual intercourse between the ages of 15 and 18 years and only, 12 (3.2%) at under 15 years. The mean age for first sexual intercourse was 19.04 ( $\pm$  SD 3.19) years, ranging from 13 to 33 years. Having only one sexual partner in the previous 12 months was reported by majority, 242 (65.4%) of the women. Only, 55 (14.95) of the respondents had a history of forced sex with 17 (4.6%) reporting having had sex in exchange for money or favor. Eighty (21.6%) of the women were aware that their partners were having sexual relations with other women who were not their co-wives. Only, 110 (29.7%) of the respondents were using modern contraceptive methods. Majority, 349 (94.3%) of the women had been screened for HIV with only 23 (6.6%) testing positive for the virus. Family history of cervical cancer was reported by 13 (3.5%) of the women in the city of Bamenda. The most frequent [47.3% (95% CI: 41.9%-52.8%)] source of information regarding screening for cervical cancer among women in the city of Bamenda was from their friends. The hospital occupied the second position for the source of information about the screening for cervical cancer [12.6% (95% CI: 9.2%-16.6%)]. Only, 9.0% (95% CI: 6.1%-12.6%) of the women had received text messages from the hospital educating them about the availability of screening facilities for cervical cancer (see Figure 1).

### **Knowledge on cervical cancer and its risk factors, symptoms and screening**

Regarding general knowledge about cervical cancer, 335(90.5%) had heard of the terms "cervical cancer". Closed to half, 202(54.6%) of the respondents knew that every woman was at risk of developing cervical cancer. The participants' knowledge on the risk factors of cervical cancer were generally poor with the most known risk factors that predispose to cervical cancer being early involvement into sexual intercourse (62; 16.8%) and having multiple sexual partners (86; 23.2%). Regarding symptoms of cervical cancer, the most known symptoms of cervical cancer mentioned by respondents were abnormal vagina bleeding (102; 27.6%) and abnormal vagina discharge (47; 12.7%). Knowledge related to cervical cancer screening were assessed. 334 (90.3%) knew there was a screening for the disease while only, 139(37.6%) was aware of the existence of a vaccine against cervical cancer. The knowledge level on the types of cervical cancer screening methods was generally low with majority, 74(46.3%) participants not knowing any of methods used in cervical cancer screening. Closely followed to that is 55 (34.4%) participants who knew of the Pap's smear test as a screening method for cervical cancer. Respondents who had a score below the mean knowledge score of 4.85( $\pm$ 2.50) were classified as having inadequate knowledge while those with mean score and above were considered as presenting with adequate knowledge on cervical cancer. A total of 162 (43.8%) of the women had correct knowledge of cervical cancer (Table 4).

### **Attitude towards Cervical Cancer**

From all the respondents, 222 (60.0%) perceived cervical cancer to be a killer disease (severe), 234 (63.2%) participants also perceived cervical cancer to be treatable if diagnosed early. Majority, 360 (97.3%) agreed that it was important to be screened for cervical cancer, with a further 314 (84.9%) saying they feel comfortable with the screening process. However, 170 (45.9%) perceived themselves as being at risk for developing the disease. Respondents who had scores below the mean attitude score of 3.51( $\pm$ 1.03) were classified as having negative attitudes while those with mean score and above were considered as presenting with positive attitudes towards cervical cancer. Only, 197 (53.2%) of the sampled women in Bamenda reported with positive attitudes towards cervical cancer (Table 5).

### **The Practice of Cervical Cancer Screening**

Table 6 shows the practices about cervical cancer among women in Bamenda. Respondents who scored below 1 were classified as having poor practices while those with the score of 1 and above were considered as presenting with good practices towards cervical cancer. Only, 178 (45.4 %) of the women in the city of Bamenda presented with a good practice about cervical cancer. Of all respondents, 160(47.9%) had been screened for cervical cancer. Majority, 53 (46.5%) of those screened had been screened only once. Only, 12(8.6%) of the respondents had been vaccinated against cervical cancer, with 6(50.0%) of them vaccinated with the Cervarix vaccine. Furthermore, 3(25.0%) of the vaccinated participants received up to three doses of the vaccine. Respondents who had scores below the mean practice of 0.81( $\pm$ 0.98) were classified as having poor practices while those with mean score and above were considered as presenting with good practices towards cervical cancer.

### **Factors Associated with Knowledge on Cervical Cancer among women in Bamenda**

Table 7 shows the factors associated with adequate knowledge on cervical cancer among the sampled women in the city of Bamenda. Women aged 41-50 (AOR=4.96; 95% CI: 2.22-11.07;  $p=0.000$ ), 51-60 (AOR=3.71; 95% CI: 1.50-9.19;  $p=0.005$ ), >60years (AOR=4.25; 95% CI: 1.54-11.76;  $p=0.005$ ) were 4 times more likely to report with adequate knowledge on cervical cancer compared to their counterparts who were 21-30 years old. Women working in the health sector (AOR=7.52; 95% CI: 2.85-19.85;  $p=0.000$ ) and students(AOR=7.61; 95% CI: 3.19-18.14;  $p=0.000$ ) were about 7 times more likely to report with adequate knowledge on cervical cancer compared to their counterparts who were in the business sector. The women who had ceased from having regular menses (women in their menopause) were approximately 2 times more likely to report with correct knowledge on cervical cancer compared to those who were experiencing regular menstrual flow (AOR=1.72; 95% CI: 1.01-2.93;  $p=0.04$ ). Participants who had a history of forced sexual intercourse were about 3 times more knowledgeable about cervical cancer compared to those who had never been forced to sex (AOR=2.26; 95% CI: 1.14-4.50;  $p=0.020$ ).

### **Factors Associated with attitudes towards Cervical Cancer among women in Bamenda**

Table 8 shows the factors associated with the positive attitudes towards cervical cancer among a sample of women in the city of Bamenda. The women who had ceased from having regular menses were about 2 times more likely to

report with positive attitudes towards cervical cancer compared to those who were experiencing regular menstrual flow (AOR=1.69; 95% CI: 1.02-2.81;  $p=0.043$ ). Women who did not know if they had a family history of cervical cancer (AOR=0.52; 95% CI: 0.27-0.99;  $p=0.047$ ) were 5 times more likely to report a positive attitude towards cervical cancer compared to their counterpart who were women who did not have any family history of cervical cancer. Closely followed were women who had a family history of cervical cancer (AOR=4.43; 95% CI: 0.91-21.55;  $p=0.065$ ) who were 4 times more likely to report a positive attitude towards cervical cancer compared to their counterpart who were women who did not have any family history of cervical cancer.

#### **Factors Associated with practices towards Cervical Cancer among women in Bamenda**

Table 9 shows the factors associated with the good practices about cervical cancer among a sample of women in the city of Bamenda. The women who were more than 60 years old (AOR=20.89; 95% CI: 3.89-105.1;  $p=0.000$ ) were 20 times more likely to report with good practice compared to their counterpart who were 21 to 30 years old. Followed to that were women who were 51 to 60 years (AOR=6.09; 95% CI: 1.74-23.43;  $p=0.005$ ) who were 6 times more likely to report with good practice than their counterpart who were 21 to 30 years old. Women who were 41 to 50 years old (AOR=4.28; 95% CI: 1.45-14.00;  $p=0.009$ ) were 4 times more likely to report good practice and women who were 31 to 40 years old (AOR=3.79; 95% CI: 1.27-10.68;  $p=0.017$ ) were 3 times more likely to report with good practice towards cervical cancer compared to those who were 21 to 30 years old.

#### **Correlation of knowledge, attitudes, and practices on cervical cancer among women in the city of Bamenda**

Figure 2 presents the correlation between participants' knowledge, attitudes and practices. There was a significant association among the participants' knowledge, attitudes, and practices ( $p<0.01$ ).

#### **DISCUSSION**

According to scientific findings, it is obvious that cervical cancer is a preventable disease[9]. An invasive cervical cancer is the second most common cancer in women worldwide[2]. To reduce the prevalence of cervical cancer, information concerning the knowledge, attitude and practice on cervical cancer is very fundamental.

#### **Knowledge on cervical cancer and its risk factors, symptoms and screening**

Regarding general knowledge about cervical cancer, majority of participants had heard of the term "cervical cancer". This could be as a result of the many sensitization messages that are available on social media as well as information from friends. This is similar to a study by Kalayu and Tesfay [13] which showed that university students who listen and watch radio and TV might get different information about cervical cancer and develop good knowledge about cervical cancer.

This could also be as a result of the fact that most participants were between the ages 21 to 30 years which is said to be highest cohort involved in social media information sharing. This is similar to a study carried out by Jan and Petra [14] in the United States of America on the use of social media. The results showed that majority (88%) of adults between 18 years to 29 years used social media.

Closed to half (54.6%) of the respondents in this study knew that every woman is at risk of developing cervical cancer. This is contrary to a study carried out among women of childbearing age in Hossana Town, Southern Ethiopia by Aweke *et al.* [8] who found out that less than half of the participants did not know all women are at risk of getting the disease. This difference could have been as a result of a difference in the study area. They also attributed this to low attention given to media promotion, variations in health information provided about cervical cancer and its exposure, differences in socio-cultural conditions, health education at healthcare facilities and other behavioral change interventions regarding the cervical cancer prevention and control program of Ethiopia [8].

The participants' knowledge on the risk factors of cervical cancer were generally poor with the most known risk factors that predispose to cervical cancer being early involvement into sexual intercourse (16.8%) and having multiple sexual partners (23.2%). This is similar to a study carried out among Women in Hospitals of Wolaita Zone in Southern Ethiopia by Tadesse *et al.* [15] who found out that less than half of their respondents (45.5%) had good knowledge about risk factors of cervical cancer. This is contrary to a study by CDC [1] that stated that the most risk factors associated to cervical cancer is Human Papilloma infection.

Regarding symptoms of cervical cancer, most participants did not know the symptoms of cervical cancer. The most known symptoms of cervical cancer mentioned by participants were abnormal vagina bleeding (102; 27.6%) and abnormal vagina discharge (47; 12.7%). This aligns with a study carried out among Students at a Medical School in Al-Ahsa, Kingdom of Saudi Arabia by Abdulaziz *et al.* [16] who found out that the majority of the participant's knowledge regarding early sign and symptoms of the cervical cancer was inadequate; on average they had 43% for male 56% for female students.

Knowledge related to cervical cancer screening were showed that most participants knew there was a screening for the disease while only few were aware of the existence of a vaccine against cervical cancer. This compliments the findings of Julia *et al.* [17]. Their findings revealed that Traditional Churches in Zimbabwe (TCZ) women of 18-29 years of age had knowledge about the nature of Pap smear as compared to other categories, and they also knew that if cervical cancer was detected early, medication and other early forms of interventions could be initiated to deal with the problem before it progressed.

The knowledge level on the types of cervical cancer screening methods was generally low with majority of participants not knowing any of the methods used in cervical cancer screening. Closely followed to that were few participants who knew of the Pap's smear test as a screening method for cervical cancer. This could be as a result of the fact that Pap's smear test is the oldest screening test for cervical cancer. This is similar to the findings of Julia *et al.* [17]. They found out that TCZ women were knowledgeable about Pap smear as compared to other categories.

In general, less than half of the participants had correct knowledge on cervical cancer. This could be as a result of the fact that most participants had information on cervical cancer from friend and very few got information on cervical cancer from the hospital. Information from friends are mostly informal and could be inadequate or inappropriate.

This in line with a study that was carried out by Tadesse *et al.*[15] who found out that level of knowledge on cervical cancer screening of women attending the hospital of Wolaita zone was low (46.1%).

### Attitude towards Cervical Cancer

From all the respondents, most perceived cervical cancer to be severe. This is in line with a study carried out by Julia *et al.*[17] who found out that Shona Women knew that cancer was the second highest killer of women compared to HIV. This is further supported by Kalayu and Tesfay[13] who found out that 85% (majority) of participants perceived cervical cancer as being severe.

A further majority of participants also perceived cervical cancer to be treatable if diagnosed early. This is similar to a study carried out among women who attend traditional churches in Zimbabwe by Julia *et al.*[17] who found out that the participants recognized that if early interventions were made, treatment of cervical cancer could reduce the chances of disease progression.

Majority, 360 (97.3%) agreed that it was important to be screened for cervical cancer, with a further 314 (84.9%) saying they feel comfortable with the screening process. This supports a study by Julia *et al.* [17] who found out that most women did not experience embarrassment undergoing a Pap smear test. However, most also reported that the gender of the health provider to carry out the Pap smear test had a significant influence on how they perceived the test. Such evidence literally brings out the underlying element of embarrassment that women felt if the doctor was either male or female.

Less than half of the participants perceived themselves as being at risk for developing the disease. This is in line with a study among Female Debre Berhan University Students by Kalayu and Tesfay [13] who found out that 85% (majority) of participants perceived cervical cancer as being severe and only 33.2% (few) of the participants believed there were susceptible to the disease.

Generally, a slight majority (53.2%) of the sampled women in Bamenda reported with positive attitudes towards cervical cancer. This is contrary to a study carried out by Tadesse [15] who classified a slight majority (54.5%) of respondents as having negative attitudes towards cervical cancer. This could be explained by the socio-economic difference between countries. This could also be linked to the difference in knowledge levels as studies have shown that good knowledge of cervical cancer is a predictor of positive attitude towards cervical cancer screening[15].

### The Practice of Cervical Cancer Screening

Generally, less than half (45.4%) of the women in the city of Bamenda presented with a good practice on cervical cancer. This is comparable to a study by Julia *et al.* [17] carried out on women who attend Traditional Churches in Zimbabwe (TCZ) who found out that although the knowledge and attitudes of these TCZ women were relatively high and positive towards understanding the development and treatment of cervical cancer, their practices involving the prevention of cervical cancer were poor.

Of all respondents, less than half of respondents had been screened for cervical cancer and majority of those screened had been screened only once. This is slightly above a study carried out by Yitagesu *et al.*[8] on the Knowledge, attitude and practice for cervical cancer prevention and control

among women of childbearing age in Hossana Town, Hadiya zone, Southern Ethiopia who found out that Only 58 (9.9%) of respondents had been screened for the cervical cancer before their survey.

In this study, only few of the respondents had been vaccinated against cervical cancer, with a further few of them vaccinated with the Cervarix 1 vaccine. This could be as a result of the fact that the vaccination against HPV was only introduced in the immunization calendar of Cameroon in 2019 with focus on children 9 to 13 years old. Furthermore, 3(25.0%) of the vaccinated participants received up to three doses of the vaccine. This contradicts a study by Redhwan *et al.* [18] on Practice of HPV Vaccine and Associated Factors among School Girls in Melaka, Malaysia where he found out that the prevalence of HPV vaccination was 77.9% among school girls in Melaka. He attributed this percentage to be due to the government offering a free vaccine for secondary school girls aged 13 years. Another possible reason is that the government in the recent years has heavily promoted the vaccine in the media and public campaigns. This difference could be as result of a difference in study area and target population.

### Factors Associated with Knowledge on Cervical Cancer among women in Bamenda

Women aged 41-50, >60 years were 4 times more likely to report with adequate knowledge on cervical cancer compared to their counterparts who were 21-30 years old. This could be as a result of the fact that women older than 40 are more predisposed to cervical cancer due to menopausal influence on hormonal imbalance. This is in line with Godstime *et al.*[19] study focused on investigating the relationship between Age and Histological types of Cervical Cancer. The results showed that the peak prevalence of cervical cancer was at the 41-50 years age group.

Women working in the health sector and students were about 7 times more likely to report with adequate knowledge on cervical cancer compared to their counterparts who were in the business sector. This could have been as a result of health education at school and networking with other students who may share health related information about cervical cancer. This is similar to a study that was done among Women in Hospitals of Wolaita Zone, Southern Ethiopia by Tadesse *et al.*[15] who found out that Participants who mentioned health professionals as their source of information were statistically significant predicted to have good knowledge of cervical cancer screening. It was also found out in this study that the association of educational status with outcome variable among women showed that mothers who had a secondary level of education were about five times more knowledgeable about cervical cancer screening compared to those who did not attend formal education. Women who had a degree/or diploma level education were about seven times more knowledgeable about cervical cancer screening compared with those who did not attend formal education. This is also in line with a study by Kalayu and Tesfay [13] which showed that students were more knowledgeable than their counterpart and this could be due to the fact that despite the difference in socio-demographic and economic background, university students who listen and watch radio and TV might get different information about cervical cancer and develop good knowledge about cervical cancer. This is conflicting with a study among women of childbearing age in Hossana Town, Hadiya zone, Southern Ethiopia by Aweke *et*



al[8] who found out that socio demographic factors were not statistically significant with poor knowledge score for cervical cancer prevention and control.

The women who had ceased from having regular menses (women in their menopause) were approximately 2 times more likely to report with correct knowledge on cervical cancer compared to those who were experiencing regular menstrual flow. This could be due to their high interest in information and quest for knowledge related to their higher predisposition to cervical cancer and the fact that women who are 40 years and above are more at risk of cervical cancer and most of them already start experiencing hormonal changes. This aligns with a study by Godstime *et al*[19] where they were investigating the relationship between Age and Histological types of Cervical Cancer. They found out that the peak prevalence of cervical cancer was at the 41-50 years age group.

Participants who had a history of forced sexual intercourse were about 3 times more knowledgeable about cervical cancer compared to those who had never been forced to sex. This could be because of the fact that they are predisposed to HIV which could lead to a weakened immune system which could therefore increase their chances of developing cervical cancer. This is supported by CDC [1] which states that Human immunodeficiency virus (HIV) which causes AIDS reduces the immunity of an individual. The immune system plays a vital role in preventing pre-cancerous cells from progressing to cancer and also prevents cancer development. In HIV infected women, the cervical pre-cancer cells progress more rapidly to invasive cancer than normal [1].

#### **Factors Associated with attitudes towards Cervical Cancer among women in Bamenda**

The women who had ceased from having regular menses were about 2 times more likely to report with positive attitudes towards cervical cancer compared to those who were experiencing regular menstrual flow. This could be due to the fact that most cases of cessation of menses was as a result of hormonal imbalance associated to advanced age which could be a predisposing factor to cervical cancer. This is supported by Godstime *et al*[19] in a study where they were investigating the relationship between Age and Histological types of Cervical Cancer. They concluded that the age group 41 to 50 years had the highest prevalence of cervical cancer.

Women who did not know if they had a family history of cervical cancer were 5 times more likely to report a positive attitude towards cervical cancer compared to their counterpart who were women who did not have any family history of cervical cancer. Closely followed were women who had a family history of cervical cancer who were 4 times more likely to report a positive attitude towards cervical cancer compared to their counterpart who were women who did not have any family history of cervical cancer. These could be as a result of knowledge of respondents on the fact that family history is a predisposing factor and therefore places them at risk of developing cervical cancer. In other cases it could be because women in the same family may be exposed to other non-genetic risk factors [1].

#### **Factors Associated with practices towards Cervical Cancer among women in Bamenda**

The women who were more than 60 years old were 20 times more likely to report with good practice compared to their counterpart who were 21 to 30 years old. This could be due

to their predisposition that comes with hormonal changes that occur as one grows older. This contradicts a study by Godstime [19] who found out that the peak age for cervical cancer prevalence was 41-50 years age group. He concluded that cervical cancer is common in women that are less than 50 years of age making young women a huge target at the most productive time of their lives. This difference could have been as a result of a difference in study population.

Followed to that were women who were 51 to 60 years who were 6 times more likely to report with good practice than their counterpart who were 21 to 30 years old. Women who were 41 to 50 years old were 4 times more likely to report good practice and women who were 31 to 40 years old were 3 times more likely to report with good practice towards cervical cancer compared to those who were 21 to 30 years old. This could be due to the fact that aging come with hormonal imbalance and a higher susceptibility to cervical trauma. This is similar to a study by Woldetsadik *et al*[20] on Socio-demographic characteristics and associated factors influencing cervical cancer screening among women attending St. Paul's Teaching and Referral Hospital, Ethiopia. They found out that the proportion of women who are screened at the age of 18-29 years was 8% which was lower than women aged 30-39 (11.9%) and 40-49 (36.1%).

Women who were not having regular menstrual flow were 2 times more likely to present with good practice towards cervical cancer screening as compared to their counterpart who were having regular menstrual flow. This could be due to the awareness of the fact that hormonal changes is a predisposing factor. This could also be as a result of the fact that majority of those who were not experiencing regular menstrual flow were already menopausal.

Women who practiced monogamy were 3 times more likely to have a positive practice towards cervical cancer compared to their counterpart who practiced polygamy. This could be due to the awareness of polygamy as a predisposing factor on the part of women who practiced polygamy. This is contrary to a study by Manga *et al*[9] on the epidemiological patterns of cervical human papillomavirus infection among women presenting for cervical cancer screening in North-Eastern Nigeria. They found out that although women in a polygamous family setting showed higher proportion of HPV infection than those in monogamous setting, the association was not statistically significant.

Women who did not know whether they have a family history of cervical cancer were 4 times more likely to have a positive practice towards cervical cancer screening, followed by those who actually had a family history of cervical cancer who were 2 times more likely to present with positive attitude towards cervical cancer screening compared to their counterpart who were women who did not have a family history of cervical cancer. This could be due to the fact when women who had a family history of cervical cancer and those who were not aware of the status of their family history of cervical cancer were more at risk due to the fact that cervical cancer could also run in families. According to the American Cancer Society, cervical cancer could also run in families. It could be because the members of the family may inherit conditions that reduce the woman's ability of fighting HPV infections. In other cases it could be because women in the same family may be exposed to other non-genetic risk factors [1].

**Correlation of knowledge, attitudes, and practices on cervical cancer among women in the city of Bamenda**

The correlation between participants' knowledge, attitudes and practices showed that there was a significant association among the participants' knowledge, attitudes, and practices ( $p < 0.01$ ). This implies that those who were more knowledgeable about cervical cancer had a positive attitude and had been screened for cervical cancer. This is contrary to a study carried out by Saad *et al* [21] among market women in Zaria, Nigeria who found out that the general knowledge on cervical cancer screening was good and the attitude was fair, however, this did not translate to good practice. This difference could be as a result of the fact that they used a smaller sample size

**CONCLUSION**

Generally, less than half the number of participants had adequate knowledge on cervical cancer and cervical cancer screening. Closed to half the sampled women in Bamenda reported with positive attitudes towards cervical cancer. Most of the participant had poor practice towards cervical cancer and cervical cancer screening. Majority of the participants had never been vaccinated against the HPV and only half the total number of those who had been vaccinated had received the complete dose of vaccines. Factors that were found to be associated with knowledge, attitude and practice of cervical cancer were: Aged, working in the health sector, cessation from having regular menses, history of forced sexual intercourse. Factors that were found to be associated to attitude were: cessation from having regular menses, planning on having up to 4 and above 4 children, ignorance on family history of cervical cancer and family history of cervical cancer. The factor that was associated to practice was: Age. Finally, the correlation between participants' knowledge, attitude and practice showed that there was a significant association among the participants' knowledge, attitudes, and practices which therefore provides sufficient evidence to reject our null hypothesis. The result obtained in this study indicates how useful it will be to establish health education programs to increase women's knowledge about cervical cancer. Health education interventions are needed to improve the understanding of the factors that increases the risk and the preventive measures of cervical cancer on risky behaviors so as to develop healthy behavior and decrease the incidence of the disease. Governments and non-governmental organizations should work in collaboration to improve knowledge of women on cervical cancer and screening among women.

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**Availability of data and materials**

Data is available in SPSS file and will be presented on requests with legitimate reasons.

**Authors' contributions**

**Conceptualization:** FCL, NNM, EOG, NO

**Data curation:** FCL, NNM, EOG, NO

**Methodology:** FCL, NNM, EOG, NO

**Formal analysis:** FCL

**Resources:** FCL

**Software:** FCL

**Supervision:** NNM, EOG, NO

**Validation:** NNM, EOG, NO

**Writing-original draft:** FCL

**Writing-review & editing:** FCL, NNM, EOG, NO

**Ethics approval and consent to participate**

The research has been approved by Institutional Review Board of the Faculty of Health Sciences at the University of Buea, Institutional Review Board of the Health Service of the Cameroon Baptist convention, Institutional Review Board of the North West Regional Hospital

**Competing interests**

The authors declare no conflict of interest.

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**Table 1: Socio-demographic characteristics of women in the city of Bamenda, Cameroon, 2020**

Characteristic	Category	Frequency	Percent (%)
<b>Age group (years)</b>	21-30	116	31.4
	31-40	83	22.4
	41-50	83	22.4
	51-60	55	14.9
	>60	33	8.9
<b>Religion</b>	Baptist	25	6.8
	Catholic	164	44.3
	Muslim	10	2.7
	Pentecostal	41	11.1
	Presbyterian	130	35.1
<b>Level of education</b>	Informal	16	4.3
	Primary	106	28.6
	Secondary	71	19.2
	Tertiary	126	34.1
<b>Marital status</b>	Cohabiting	10	2.7
	Divorced	3	0.8
	Married	216	58.4
	Separated	13	3.5
	Single	80	21.6
	Widow	48	13.0
<b>Form of marriage</b>	Monogamy	183	84.7
	Polygamy	33	15.3

<b>Occupation</b>	Business	84	22.7
	Farmer	51	13.8
	Health worker	37	10.0
	Housewife	60	16.2
	Student	56	15.1
	Employed	70	18.9
	Unemployed	12	3.2

**Table 2: Reproductive characteristics of women in the city of Bamenda in Cameroon, 2020**

Characteristic	Category	Frequency	Percent (%)
<b>Regular menstrual periods</b>	No	186	50.3
	Yes	184	49.7
<b>Reasons for ceased menses</b>	Disease	2	1.1
	Family planning	18	9.7
	Hysterectomy	8	4.3
	Menopause	103	55.4
	Pregnancy	6	3.2
	Recently had a baby	9	4.8
	Stress	6	3.2
	No response	34	18.3
<b>Gravidity</b>	None	41	11.1
	1-4	165	44.6
	>4	164	44.3
<b>Parity</b>	None	50	13.5
	1-4	218	58.9
	>4	102	27.6
<b>Number of Abortion</b>	None	182	49.2
	1-2	156	42.2
	>2	32	8.6
<b>Number of living children</b>	None	55	14.9
	1-4	230	62.2
	>4	85	23.0
<b>Number of expected children</b>	None	19	5.1
	1-4	180	48.6
	>4	171	46.2

**Table 3: Sexual and family planning characteristics of women in the city of Bamenda, Cameroon, 2020**

Characteristic	Category	Frequency	Percent (%)
<b>Age at first sexual intercourse (years)</b>	<15	12	3.2
	15-18	193	52.2
	>18	165	44.6
<b>Number sexual partners in the past 12 months</b>	None	77	20.8
	1	242	65.4
	2	27	7.3
	>2	24	6.5
<b>History of forced sex</b>	No	315	85.1
	Yes	55	14.9
<b>Had sex for money or favor</b>	No	353	95.4
	Yes	17	4.6
<b>Partner has other sexual partners</b>	No	116	31.4
	Yes	80	21.6
	Unknown	174	47.0
<b>Modern contraceptives user</b>	No	260	70.3
	Yes	110	29.7
<b>Tested for HIV</b>	No	21	5.7
	Yes	349	94.3
<b>HIV test result</b>	Negative	326	93.4
	Positive	23	6.6
<b>Family history of cervical cancer</b>	No	306	82.7
	Yes	13	3.5
	Don't know	51	13.8

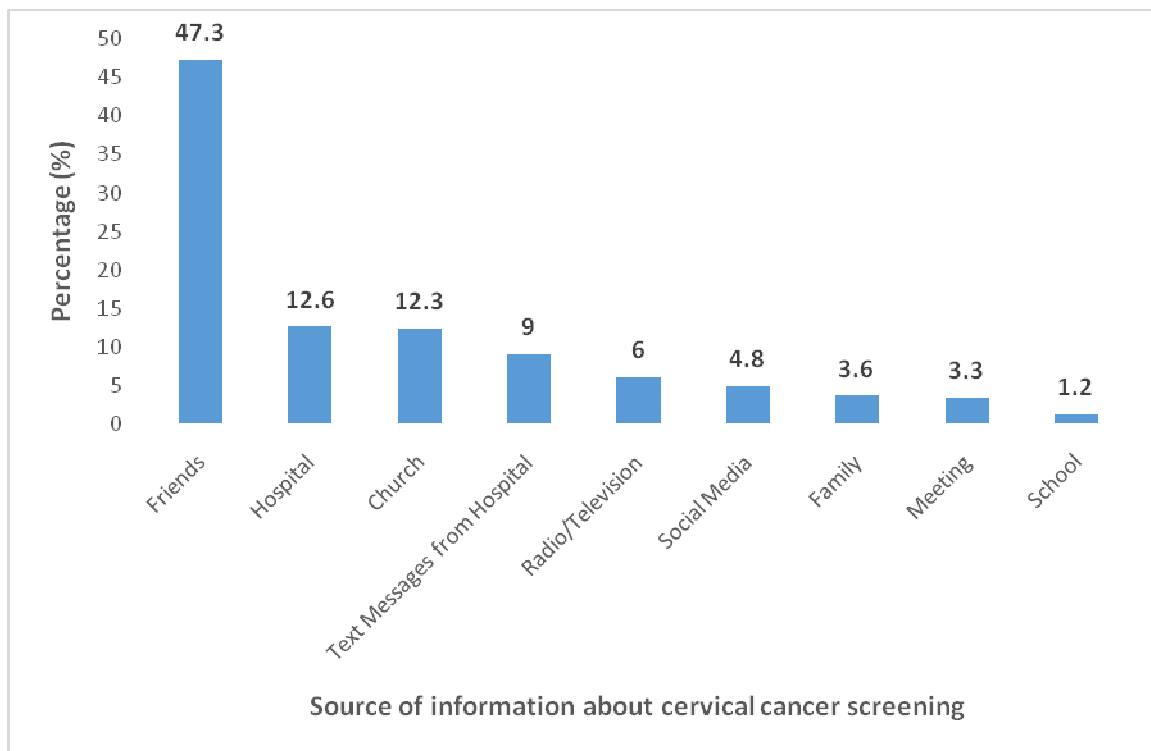


Figure 1: Sources of information regarding screening for cervical cancer among women in Bamenda

Table 4: Knowledge on Cervical Cancer among Women in Bamenda of Cameroon, 2019

Knowledge of Cervical Cancer	Correct Response No (%)	95% CI
<b>General knowledge about cervical cancer</b>		
Heard of the name "cervical cancer"	335 (90.5)	87.1%-93.3%
Screening prevents cervical cancer	90 (24.3)	20.0%-29.0%
Every woman is at risk of developing cervical cancer	202 (54.6)	49.4%-59.8%
<b>Knowledge related to the risk factors of cervical cancer</b>		
Early involvement into sexual intercourse	62(16.8)	13.1%-21.0%
Frequent irritation of cervix with chemicals	7(1.9)	0.8%-3.9%
Multiple abortion	5(1.4)	0.4%-2.1%
Multiple full-term deliveries	7(1.9)	0.8%-3.9%
Multiple sexual partners	86(23.2)	19.0%-27.9%
Unprotected sexual intercourse	3(0.8)	0.2%-2.4%
Older women	4(1.1)	0.3%-2.7%
Repeated sexually transmitted infections	1(0.3)	0.01%-1.5%
<b>Knowledge related to the symptom of cervical cancer</b>		
Bleeding after menopause	9(2.4)	1.1%-4.6%
Cervical inflammation	3(0.8)	0.2%-2.4%
Painful intercourse	9(2.4)	1.1%-4.6%
Abnormal vagina bleeding	102(27.6)	23.1%-32.4%
Abnormal vagina discharge	47(12.7)	9.5%-16.5%
Vagina pains	38(10.3)	7.4%-13.8%
<b>Knowledge related to prevention of cervical cancer</b>		
There is screening for cervical cancer	334 (90.3)	86.8%-93.1%
There is a vaccine to prevent cervical cancer	139 (37.6)	32.6%-42.7%
Method of screening for cervical cancer		
VIA	15(9.4)	5.3%-15.0%
VILI	16(10.0)	5.8%-15.7%
PAP'S TEST	55(34.4)	27.1%-42.3%
Don't know	74(46.3)	38.4%-54.3%
<b>Composite Knowledge score</b>		
Adequate Knowledge	182 (49.2)	44.0%-54.4%
Inadequate knowledge	188 (50.8)	45.6%-56.0%



**Table 5: Attitude towards Cervical Cancer among Women in Bamenda of Cameroon, 2019**

Attitude towards Cervical Cancer	Correct Response No (%)	95% CI
Cervical cancer is a killer disease	222 (60.0)	54.8%-65.0%
Cervical cancer is treatable if diagnosed early	234 (63.2)	58.1%-68.2%
Important to be screened for cervical cancer	360 (97.3)	95.1%-98.7%
Feel comfortable being screened for cervical cancer	314 (84.9)	80.8%-88.4%
Perceive self as being at risk of developing cervical cancer	170 (45.9)	40.8%-51.2%
Composite Attitude score		
Negative Attitude	173 (46.8)	41.6%-52.0%
Positive Attitude	197 (53.2)	48.0%-58.4%

**Table 6: Practices towards Cervical Cancer among Women in Bamenda of Cameroon, 2019**

Practice about Cervical Cancer	Correct Response No (%)	95% CI
Ever screened for cervical cancer	160(47.9)	42.4%-53.4%
Number of screening carried out		
one	53(46.5)	37.3%-55.6%
two	33(28.9)	20.6%-37.3%
three	15(13.2)	7.0%-19.4%
Four and more	13(11.5)	5.6%-17.2%
Ever been vaccinated against cervical cancer	12(8.6)	4.0%-13.3%
Type of vaccine used		
Cervarix 1	6(50.0)	21.1%-78.9%
Don't know	6(50.0)	21.1%-78.9%
Number of vaccine doses received		
One	5(41.7)	15.2%-72.3%
Two	4(33.3)	9.9%-65.1%
Three	3(25.0)	5.5%-57.2%
Composite Practice score		
Poor Practice	202(54.6)	49.4%-59.8%
Good Practice	178(45.4)	42.9%-53.3%

**Table 7a: Factors associated with knowledge on cervical cancer among women in Bamenda**

Characteristic	Knowledge of cervical cancer		COR	p-value	AOR	p-value
	Incorrect	Correct				
Age group (years)						
21-30	64(55.2)	52(44.8)	1.00	-	1.00	-
31-40	49(59.0)	34(41.0)	0.84	0.588	1.81	0.131
41-50	32(38.8)	51(61.4)	1.96	0.021	4.96	0.000
51-60	23(41.8)	32(58.2)	1.71	0.104	3.71	0.005
>60	14(42.4)	19(57.6)	1.67	0.198	4.25	0.005
Level of education						
Informal	10 (62.5)	6 (37.5)	1.00	-		
Primary	59 (55.7)	47 (44.3)	1.33	0.608		
Secondary	63 (51.6)	59 (48.4)	1.56	0.416		
Tertiary	50 (39.7)	76 (60.3)	2.53	0.090		
Marital status						
Single	37 (46.3)	43 (53.8)	1.00	-		
Married	111 (51.4)	105 (48.6)	0.81	0.433		
Separated	5 (38.5)	8 (61.5)	1.38	0.602		
Divorced	1(33.3)	2(66.7)	1.72	0.663		
Widow	22 (45.8)	26 (54.2)	1.02	0.963		
Cohabiting	6(60.0)	4(40.0)	1.57	0.416		
Form of marriage						
Monogamy	93 (50.8)	90 (49.2)	1.00	-		
Polygamy	18 (54.5)	15 (45.5)	0.97	0.825		
Occupation						
Business	51 (60.7)	33 (39.3)	1.00	-	1.00	-
Employed	31 (44.3)	39 (55.7)	1.94	0.043	1.68	0.152
Farmer	22 (43.1)	29 (56.9)	2.04	0.048	1.19	0.673
Health worker	8 (21.6)	29 (78.4)	5.60	0.000	7.52	0.000
Housewife	43 (71.7)	17 (28.3)	0.61	0.175	0.55	0.141
Student	19 (33.9)	37 (66.1)	3.01	0.002	7.61	0.000
Unemployed	8 (66.7)	4(33.3)	0.77	0.692	0.86	0.827
Regular menstrual periods						

No	79 (42.5)	107 (57.5)	1.72	0.010	1.72	0.045
Yes	103 (56.0)	81 (44.0)	1.00	-	1.00	-
Gravidity						
None	19 (46.3)	22 (53.7)	1.00	-		
1-4	91 (55.2)	74 (44.8)	0.70	0.313		
>4	72 (43.9)	92 (56.1)	1.10	0.779		

COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio

**Table 7b: Factors associated with knowledge on cervical cancer among women in Bamenda continuation**

Characteristic	Knowledge of cervical cancer	COR	p-value	AOR	p-value
	Incorrect	Correct			
Parity					
None	23 (46.0)	27 (54.0)	1.00	-	
1-4	114 (52.3)	104 (47.7)	0.77	0.423	
>4	45 (44.1)	57 (55.9)	1.08	0.826	
Number of Abortion					
None	99 (54.4)	83 (45.6)	1.23	0.602	
1-2	64 (41.0)	92 (59.0)	2.10	0.060	
>2	19 (59.4)	13 (40.6)	1.00	-	
Number of living children					
None	25 (45.5)	30 (54.5)	1.02	0.960	
1-4	118 (51.3)	112 (48.7)	0.81	0.393	
>4	39 (45.9)	46 (54.1)	1.00	-	
Age at first sexual intercourse (years)					
<15	3 (25.0)	9 (75.0)	2.82	0.129	
15-18	99 (51.3)	94 (48.7)	0.89	0.596	
>18	80 (48.5)	85 (51.5)	1.00	-	
Number sexual partners in the past 12 months					
None	35 (45.5)	42 (54.5)	1.00	-	
1	127 (52.5)	115 (47.5)	0.76	0.284	
2	10 (37.0)	17 (63.0)	1.42	0.449	
>2	10 (41.7)	14 (58.3)	1.17	0.745	
History of forced sex					
No	162 (51.4)	153 (48.6)	1.00	-	1.00
Yes	20 (36.4)	35 (63.6)	1.85	0.041	2.26
Had sex for money or favor					
No	174 (49.3)	179 (50.7)	1.00	-	
Yes	8 (47.1)	9 (52.9)	1.09	0.857	
Partner has other sexual partners					
No	53 (45.7)	63 (54.3)	1.00	-	
Yes	46 (57.5)	34 (42.5)	0.62	0.105	
Unknown	83 (47.7)	91 (52.3)	0.92	0.737	
Modern contraceptives user					
No	122 (46.9)	138 (53.1)	1.36	0.181	
Yes	60 (54.5)	50 (45.5)	1.00	-	

COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio

**Table 7c: Factors associated with knowledge on cervical cancer among women in Bamenda continuation**

Characteristic	Knowledge of cervical cancer		COR	p-value	AOR	p-value
	Incorrect	Correct				
Tested for HIV						
No	14 (66. 7)	7 (33. 3)	1. 00	-		
Yes	168 (48. 1)	181 (51. 9)	2. 16	0. 106		
HIV test result						
Negative	155 (47. 5)	171 (52. 5)	1. 43	0. 407		
Positive	13 (56. 5)	10 (43. 5)	1. 00	-		
Family history of cervical Cancer						
No	147 (48. 0)	159 (52. 0)	1. 00	-		
Yes	8 (61. 5)	5 (38. 5)	0. 58	0. 346		
Don't know	27 (52. 9)	24 (47. 1)	0. 82	0. 517		

COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio

**Table 8a: Factors associated with attitudes on cervical cancer among women in the Bamenda**

Characteristic	Attitudes towards cervical cancer		COR	p-value	AOR	p-value
	Negative	Positive				
Age group (years)						
21-30	65 (56.0)	51 (44.0)	1.00	-	1.00	-
31-40	42 (50.6)	41 (49.4)	1.24	0.449	1.23	0.517
41-50	30 (36.1)	53 (63.9)	2.25	0.006	1.90	0.078
51-60	24 (43.6)	31 (56.4)	1.65	0.131	1.82	0.194
>60	12 (36.4)	21 (63.6)	2.23	0.049	2.21	0.135
Level of education						
Informal	9 (56.3)	7 (43.8)	1.00	-		
Primary	51 (48.1)	55 (51.9)	1.39	0.545		
Secondary	60 (49.2)	62 (50.8)	1.33	0.596		
Tertiary	53 (42.1)	73 (57.9)	1.77	0.286		
Marital status						
Single	42 (52.5)	38 (47.5)	1.00	-	1.00	-
Married	96 (44.4)	120 (55.6)	4.67	0.273	3.70	0.370
Separated	3 (23.1)	10 (76.9)	2.92	0.128	2.38	0.247
Divorced	1 (33.3)	2 (66.7)	7.78	0.031	5.89	0.076
Widow	24 (50.0)	24 (50.0)	2.11	0.303	2.94	0.168
Cohabiting	7 (70.0)	3 (30.0)	2.33	0.257	1.41	0.671
Form of marriage						
Monogamy	81 (44.3)	102 (55.7)	1.05	0.899		
Polygamy	15 (45.5)	18 (54.5)	1.00	-		
Occupation						
Business	37 (44.0)	47 (56.0)	2.54	0.152		
Employed	26 (37.1)	44 (62.9)	3.39	0.065		
Farmer	23 (45.1)	28 (54.9)	2.44	0.187		
Health worker	13 (35.1)	24 (64.9)	3.69	0.063		
Housewife	37 (61.0)	23 (38.3)	1.24	0.744		
Student	29 (51.8)	27 (48.2)	1.86	0.352		
Unemployed	8 (66.7)	4 (33.3)	1.00	-		

COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio

**Table 8b: Factors associated with attitudes on cervical cancer among women in the Bamenda continuation**

Characteristic	Attitudes towards cervical cancer	COR	p-value	AOR	p-value	
	Negative	Positive				
Regular menstrual periods						
No	73 (39.2)	113 (60.8)	1.84	0.004	1.69	0.043
Yes	100 (54.3)	84 (45.7)	1.00	-	1.00	-
Gravidity						
None	27 (65.9)	14 (34.1)	1.00	-	1.00	-
1-4	77 (46.7)	88 (53.3)	2.20	0.030	2.01	0.417
>4	69 (42.1)	95 (57.9)	2.66	0.008	2.25	0.422
Parity						
None	31 (62.0)	19 (38.0)	1.00	-	1.00	-
1-4	97 (44.5)	121 (55.5)	2.04	0.027	0.25	0.270
>4	45 (44.1)	57 (55.9)	2.07	0.040	0.24	0.302
Number of Abortion						
None	95 (52.2)	87 (47.8)	1.00	-	1.00	-
1-2	61 (39.1)	95 (60.9)	1.70	0.016	1.49	0.164
>2	17 (53.1)	15 (46.9)	0.96	0.923	0.77	0.575
Number of living children						
None	34 (61.8)	21 (38.2)	1.00	-	1.00	-
1-4	99 (43.0)	131 (57.0)	2.14	0.013	3.02	0.260
>4	40 (47.1)	45 (52.9)	1.82	0.089	2.19	0.483
Number of expected children						
None	14 (73.7)	5 (26.3)	1.00	-	1.00	-
1-4	83 (46.1)	97 (53.9)	3.27	0.029	4.52	0.011
>4	76 (44.4)	95 (55.6)	3.50	0.021	4.32	0.012



Age at first sexual intercourse (years)						
<15	3 (25.0)	9 (75.0)	1.00	-		
15-18	91 (47.2)	102 (52.8)	0.37	0.149		
>18	79 (47.9)	86 (52.1)	0.36	0.139		
Number sexual partners in the past 12 months						
None	38 (49.4)	39 (50.6)	1.44	0.443		
1	112 (46.3)	130 (53.7)	1.63	0.263		
2	9 (33.3)	18 (66.7)	2.80	0.077		
>2	14 (58.3)	10 (41.7)	1.00	-		

COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio

**Table 8c: Factors associated with attitudes on cervical cancer among women in the Bamenda continuation**

Characteristic	Attitudes towards cervical cancer		COR	p-value	AOR	p-value
	Negative	Positive				
History of forced sex						
No	148 (47.0)	167 (53.0)	0.94	0.834		
Yes	25 (45.5)	30 (54.5)	1.00	-		
Had sex for money or favor						
No	165 (46.7)	188 (53.3)	1.00	-		
Yes	8 (47.1)	9 (52.9)	0.99	0.980		
Partner has other sexual partners						
No	49 (42.2)	67 (57.8)	1.00	-		
Yes	36 (45.0)	44 (55.0)	0.94	0.702		
Unknown	88 (50.6)	86 (49.4)	0.72	0.164		
Modern contraceptives user						
No	122 (46.9)	138 (53.1)	1.00	-		
Yes	51 (46.4)	59 (53.6)	1.02	0.921		
Tested for HIV						
No	11 (52.4)	10 (47.6)	1.00	-		
Yes	162 (46.4)	187 (53.6)	1.27	0.596		
HIV test result						
Negative	149 (45.7)	177 (54.3)	1.00	-		
Positive	13 (56.5)	10 (43.5)	0.65	0.318		
Family history of cervical Cancer						
No	138 (45.1)	168 (54.9)	1.00	-	1.00	-
Yes	2 (15.4)	11 (84.6)	4.52	0.052	4.43	0.065
Don't know	33 (64.7)	18 (35.3)	0.45	0.011	0.52	0.047

COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio

**Table 9a : Factors associated with practices towards cervical cancer among women in Bamenda**

Characteristic	Practices of cervical cancer		COR	p-value	AOR	p-value
	Poor	Good				
Age group (years)						
21-30	80 (69.0)	36 (31.0)	1.00	-	1.00	-
31-40	46 (55.4)	37 (44.6)	1.79	0.052	3.79	0.017
41-50	41 (49.4)	42 (50.6)	2.28	0.006	4.28	0.009
51-60	23 (41.8)	32 (58.2)	3.09	0.001	6.09	0.005
>60	12 (36.4)	21 (63.6)	3.89	0.001	20.89	0.000
Religion						
Baptist	12 (48.0)	13 (52.0)	1.00	-	1.00	-
Catholic	87 (53.0)	77 (47.0)	0.82	0.638	0.54	0.384
Muslim	9 (90.0)	1 (10.0)	0.10	0.043	0.24	0.277
Pentecostal	23 (56.1)	18 (43.9)	0.72	0.523	0.44	0.315
Presbyterian	71 (54.6)	59 (45.4)	0.77	0.544	0.46	0.270
Level of education						
Informal	12 (75.0)	4 (25.0)	1.00	-		
Primary	66 (62.3)	40 (37.7)	1.82	0.328		
Secondary	62 (50.8)	60 (49.2)	2.90	0.078		
Tertiary	62 (49.2)	64 (50.8)	3.10	0.061		

Marital status						
Single	48 (60.0)	32 (40.0)	1.00	-		
Married	110 (50.9)	106 (49.1)	1.45	0.166		
Separated	7 (53.8)	6 (46.2)	1.29	0.676		
Divorced	2 (66.7)	1 (33.3)	0.75	0.817		
Widow	27 (56.3)	21 (43.8)	1.17	0.677		
Cohabiting	8 (80.0)	2 (20.0)	0.38	0.233		
Form of marriage						
Monogamy	87 (47.5)	96 (52.5)	2.54	0.022	2.53	0.069
Polygamy	23 (69.7)	10 (30.3)	1.00	-	1.00	-
Occupation						
Business	54 (64.3)	30 (35.7)	1.67	0.468	-	-
Employed	26(37.1)	44 (62.9)	5.08	0.022	-	-
Farmer	26 (51.0)	25 (49.0)	2.89	0.143	-	-
Health worker	14 (37.8)	23 (62.2)	4.93	0.033	-	-
Housewife	40 (66.7)	20 (33.3)	1.50	0.574	-	-
Student	33 (58.9)	23 (41.1)	2.09	0.306	-	-
Unemployed	9 (75.0)	3 (25.0)	1.00	-		

COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio

**Table 9b : Factors associated with practices towards cervical cancer among women in Bamenda continuation**

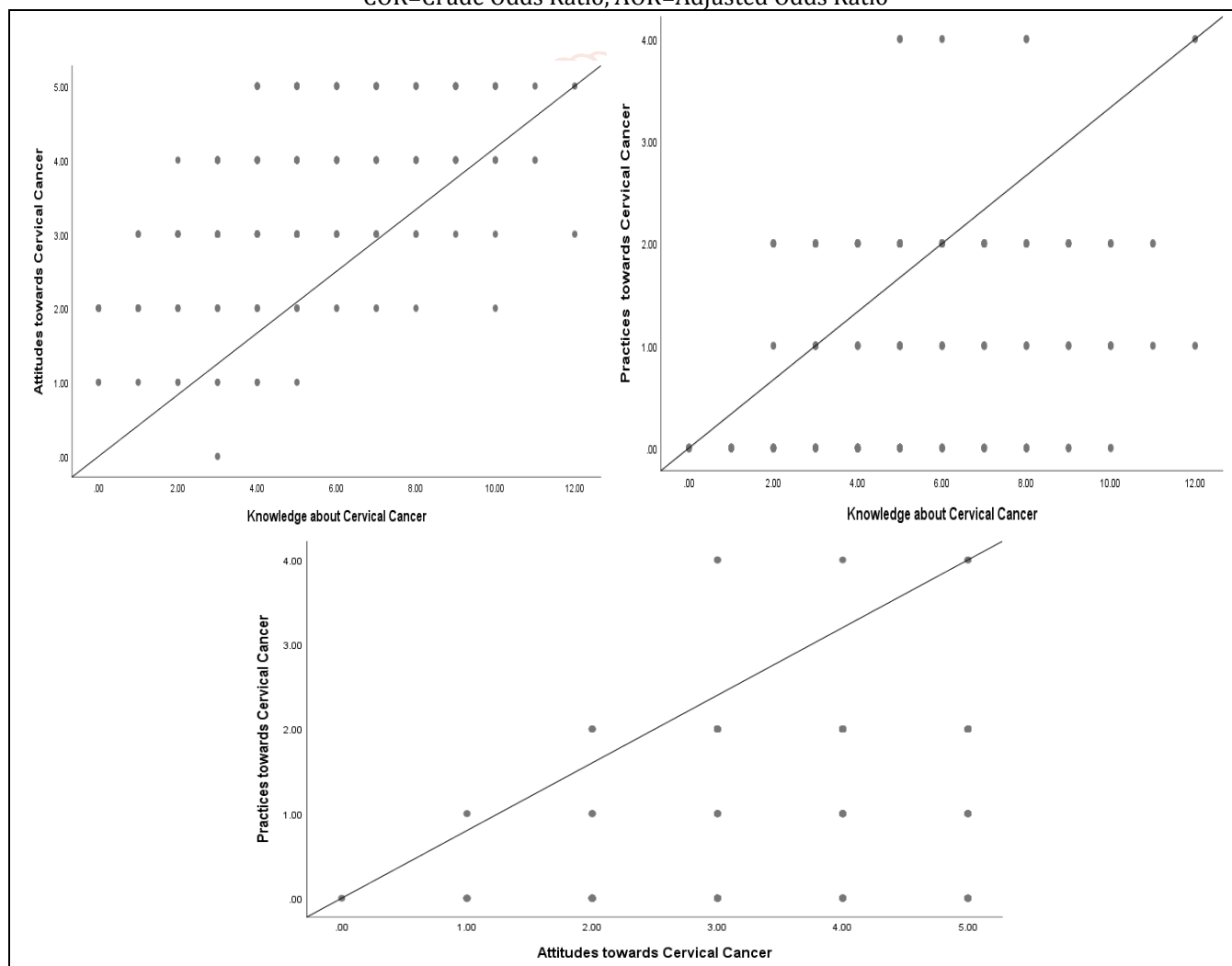
Characteristic	Practices of cervical cancer		COR	p-value	AOR	p-value
	Poor	Good				
Regular menstrual periods						
No	86 (46.2)	100 (53.8)	1.98	0.001	1.80	0.125
Yes	116 (63.0)	68 (37.0)	1.00	-	1.00	-
Gravidity						
None	27 (65.9)	14 (34.1)	1.00	-		
1-4	93 (56.4)	72 (43.6)	1.49	0.272		
>4	82 (50.0)	82 (50.0)	1.93	0.072		
Parity						
None	35 (70.0)	15 (30.0)	1.00	-	-	-
1-4	122 (56.0)	96 (44.0)	1.84	0.072	-	-
>4	45 (44.1)	57 (55.9)	2.96	0.003	-	-
Number of Abortion						
None	99 (54.4)	83 (45.6)	1.00	-		
1-2	82 (52.6)	74 (47.4)	1.08	0.736		
>2	21 (65.6)	11 (34.4)	0.63	0.241		
Number of living children						
None	39 (70.9)	16 (29.1)	1.00	-	-	-
1-4	125 (54.3)	105 (45.7)	2.05	0.027	-	-
>4	38 (44.7)	47 (55.3)	2.02	0.003	-	-
Number of expected children						
None	11 (57.9)	8 (42.1)	1.00	-		
1-4	97 (53.9)	83 (46.1)	1.18	0.739		
>4	94 (55.0)	77 (45.0)	1.13	0.808		
Age at first sexual intercourse (years)						
<15	4 (33.3)	8 (66.7)	1.00	-		
15-18	113 (58.5)	80 (41.5)	0.35	0.099		
>18	85 (51.5)	80 (48.5)	0.41	0.233		
Number of sexual partners						
None	43 (55.8)	34 (44.2)	0.79	0.616		
1	134 (55.4)	108 (44.6)	0.81	0.614		
2	13 (48.1)	14 (51.9)	1.08	0.895		
>2	12 (50.0)	12 (50.0)	1.00	-		
History of forced sex						
No	172 (54.6)	143 (45.4)	1.00	-		
Yes	30 (54.5)	25 (45.5)	1.00	0.994		
Had sex for money or favor						
No	192 (54.4)	161 (45.6)	1.00	-		
Yes	10 (58.8)	7 (41.2)	1.84	0.720		

COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio

**9c : Factors associated with practices about cervical cancer among women in Bamenda continuation**

Characteristic	Practices of cervical cancer		COR	p-value	AOR	p-value
	Poor	Good				
Partner has other sexual partners						
No	58 (50.0)	58 (50.0)	1.00	-		
Yes	48 (60.0)	32 (40.0)	0.67	0.168		
Unknown	96 (55.2)	78 (44.8)	0.81	0.387		
Modern contraceptives user						
No	139 (53.5)	121 (46.5)	1.17	0.501		
Yes	63 (57.3)	47 (42.7)	1.00	-		
Tested for HIV						
No	15 (71.4)	6 (28.6)	1.00	-		
Yes	187 (53.6)	162 (46.4)	2.17	0.118		
HIV test result						
Negative	176 (54.0)	150 (46.0)	1.00	-		
Positive	11 (47.8)	12 (52.2)	1.28	0.568		
Family history of cervical Cancer						
No	160 (52.3)	146 (47.7)	1.00	-	1.00	-
Yes	7 (53.8)	6 (46.2)	0.94	0.912	0.29	0.101
Don't know	35 (68.6)	16 (31.4)	0.50	0.032	0.40	0.112

COR=Crude Odds Ratio, AOR=Adjusted Odds Ratio



Knowledge	1		
Attitudes	0.555*	1	
Practices	0.420*	0.320*	1
Variables	Knowledge	Attitudes	Practices

\*\* Correlation is significant at the 0.01 level (2-tailed)

**Figure 2: Correlation scatter of knowledge, attitudes, and practices of cervical cancer among women in the city of Bamenda: A: Knowledge vs. Attitudes, B: Knowledge vs Practices, C: Attitudes vs Practices**